SEALING STRUCTURE OF AUTOMOBILE

The present invention relates to a sealing structure of an automobile, in particular a sealing structure that is capable of treating water invading between glass retaining members which partition door glass in a hardtop vehicle, etc., and open-top vehicle, etc., (hereinafter merely called a "hardtop vehicle, etc.,"), for example, as shown in Fig. 6, between the center sash partitioning off triangular glass 2 of the front door 1 and the front glass 3 and a weatherstrip attached to a roof-side and resiliently brought into contact with the upper edge of the triangular glass 2 and front glass 3.

BACKGROUND OF THE INVENTION

In a hardtop vehicle, etc., there are some types in which the door glass of a window is composed of a plurality of glasses, one of which is a fixed type and the other of which is elevated for closing and lowered for opening. In such a hardtop vehicle, etc., a partition attached to the side edge of a fixed glass and a glassrun through which a side edge of elevating glass is passed are mounted at the center sash which operates as a glass retaining member partitioning respective glasses of a door, and a weatherstrip resiliently brought into contact with the upper edge of respective glasses is attached to the roofside.

Fig. 7 through Fig. 10 show one example of the

above-described sealing structure, wherein Fig. 7 shows an enlarged view of portion "a" of the center sash 4 shown in Fig. 6, Fig. 8 is a view taken along the line D-D in Fig. 7, and Fig. 9 is a view taken along the line E-E in the same drawing.

The center sash 4 is made of metal or resin, and its section is roughly I-shaped as shown in Fig. 9. A partition 5 and a glassrun 6 are mounted in attaching recesses 4a and 4b at both sides of the center sash 4, respectively. The partition 5 is attached to the side edge of a triangular glass 2, and the side edge of an elevating front glass 3 is inserted into the glassrun 6.

Also, the center sash 4 has a resin-made die-molded portion 7, whose tip end is made thin, integrally formed on the upper end thereof, and the partition 5 is attached to the side edge of a triangular glass 2, and at the same time, the side edge of the elevated front glass 3 is inserted into the other side thereof.

In addition, with respect to triangular marks shown in Fig. 7, the solid black portions thereof show die-molded portions, and whiteout portions thereof show extrusion-molded portions. This is the same in the following drawings.

Fig. 10 shows roofside weatherstrip 9 attached to the open-edge portion of a door of a vehicle, etc., body in a hardtop

vehicle, etc.,. The weatherstrip 9 is composed of an attaching base portion 13 mounted at a holder 12 attached to a body panel 11; a hollow sealing portion 14 integrally molded with the corresponding attaching base portion 13, and a lip 15 resiliently brought into contact with the body panel 11 and covering up a retainer 12. When the door 1 is closed, the upper edge of the triangular glass, tip end portion of the die-molded portion and upper edge of the elevated front glass are brought into contact with a sealing portion 14, wherein sealing is brought about. The drawing shows a state where the tip end portion of the die-molded portion is brought into contact with the sealing portion 14. In the drawing, a lacing braid 16 is shown, which is provided integrally with the holder 12 and is brought into contact with the body panel 11.

The die-molded portion 7 at the upper end of the above-described center sash is made thin at the tip end portion as shown in Fig. 13. Nevertheless, the thickness of the die-molded portion 7 at its tip end portion is thicker than the thickness of the triangular glass 2 and front glass 3 as shown in Fig. 8 and is step-formed. Therefore, when the front door 1 is closed, as shown in Fig. 11, clearance c_1 is provided between the hollow sealing portion 14 of the roofside weatherstrip 9 and the triangular glass 2 or front glass 3,

wherein water invades the clearance c_1.

In order to solve the problem, in the prior arts, some countermeasures have been employed, one of which has been to eliminate a gap between the sealing portion 14 and the triangular glass 2 or front glass 3 by making the tip end portion of the die-molded portion remarkably thin, and the other of which is to increase the adhesiveness of the tip end portion of the die-molded portion and sealing portion 14 by inserting a pad in the hollow sealing portion 14 when the door is closed.

Further, as shown in Fig. 12 and Fig. 13, another type was proposed, in which the roofside weatherstrip is formed by using a mold at the point at which the die-molded portion 7 of the upper end of the center sash is made to contact, a water receiver 18 is integrally formed at the die-molded portion 9a and receives water invading from the above-described clearance c_1, and water is discharged through a water draining port 19.

However, the respective countermeasures described above are not sufficient as countermeasures for treating water invading from clearance c_1. Further, as shown in Fig. 12 and Fig. 13, in the method for providing the water receiver 18, the appearance of the water receiver is not satisfactory when the door is opened, and since the point at which the die-molded portion 7 is made to contact at the upper end of the center

sash is formed by using a mold, the number of processes in manufacturing a roofside weatherstrip 9 is increased, thereby resulting in an increase in production costs.

It is therefore an object of the present invention to provide a sealing structure for a hardtop vehicle, (etc.,) for which a countermeasure for treating water invading from the above-described clearance c_1 is employed.

SUMMARY OF THE INVENTION

In a hardtop vehicle, (etc.,) which is the target of the present invention, a glass-retaining member such as, for example, a center sash 4 shown in Fig. 6, which partitions a door glass, is provided at a door. A partition attached to the side edge of the fixed glass and/or a glassrun through which the side edge of the elevating glass is passed are mounted at both sides of the glass-retaining member, and a die-molded portion whose tip end is made thin is integrally formed at the upper edge thereof. On the other hand, a roofside weatherstrip which carries out sealing is provided at the roofside, and the upper edge of the glass and the die-molded portion at the upper edge of the above-described glass-retaining member are resiliently brought into contact with the roofside wetherstrip. A water receiver which goes along the glass-retaining member is continuously formed integrally at the above-described

die-molded portion, the above-described partition and/or glassrun, and the opening at the upper end of the water receiver is directed to the clearance c_1 among the roofside weatherstrip, the die-molded portion at the upper edge of the above-described glass-retaining member, and the upper edge of the door glass when the door is closed, and the lower end of the water receiver is opened in the door panel which is lower than the belt line.

According to the present invention, water invading from the above-described clearance passes through the water receiver and is caused to flow down in the door panel which is lower than the belt line, wherein invaded water can be securely discharged, and no water is accumulated in the water receiver. Therefore, it is not necessary to make the water receiver large so that accumulated water does not overflow. In addition, the partition and glassrun are usually extrusion-molded, and the water receiver can be simultaneously molded by extrusion molding. Also, in the case of molding, the water receiver can be integrally formed, wherein there is no need to additionally prepare a die molding process in order to mold the water receiver.

According to Another invention a weatherstrip has a lip piece, in which a water receiver is integrally formed with the partition and/or glassrun, and whose tip end is resiliently brought into contact with the door glass with clearance remaining

between the same and glass.

According to the invention, since a part of the water receiver is composed of a door glass, the water receiver can be downsized, and can be further miniaturized, and sealing performance of the die-molded portion, partition and/or glassrun can be further improved.

Other features and effects of the present invention will be more clearly understood in the following detailed description of the embodiment by those skilled in the art. It must be, however, noted that the technical scope of the present invention is not limited to the embodiment and the accompanying drawings alone.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front elevational view showing an upper end portion of the center sash according to the invention, which is observed from the interior side of a vehicle, etc.,;

Fig. 2 is a sectional view taken along the line A-A in Fig. 1;

Fig. 3 is a sectional view taken along the line B-B in the same drawing;

Fig. 4 is a sectional view taken along the line C-C in the same drawing;

Fig. 5 is a side elevational view of the upper end portion of the center sash shown in Fig. 1;

Fig. 6 is a front elevational view of a door for a hardtop vehicle, etc.,;

Fig. 7 is a front elevational view showing an upper end portion of the center sash according to the prior arts, which is observed from the exterior side of a vehicle, etc.,;

Fig. 8 is a sectional view taken along the line D-D in Fig. 7;

Fig. 9 is a sectional view taken along the line E-E in Fig. 7;

Fig. 10 is a sectional view of a roofside weatherstrip to which a die-molded portion at the upper end portion of the center sash is pressed by closing the door;

Fig. 11 is a view showing a state where clearance c_1 is formed between a roofside weatherstrip and triangular glass and/or front glass;

Fig. 12 is a front elevational view showing the die-molded portion of a weatherstrip to which the die-molded portion is fitted; and

Fig. 13 is a longitudinally sectional view showing the die-molded portion of a weatherstrip to which the die-molded portion is fitted.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereinafter, a description is given of a sealing structure

according to one embodiment of the present invention with reference to Fig. 1 through Fig. 5. In the drawings, parts that are the same as those in Fig. 7 through Fig. 9 are given the same reference numbers.

Fig. 1 is a view showing the upper end portion of the center sash 4 according to the invention, which is observed from the interior side of a vehicle, etc.,, Fig. 2 is a sectional view taken along the line A-A in Fig. 1, Fig. 3 is a sectional view taken along the line B-B in the same drawing, Fig. 4 is a sectional view taken along the line C-C in the same drawing, and Fig. 5 is a view showing the side of the center sash 4 which operates as a glass-retaining member for retaining glass. Lip pieces 23 and 24 whose tip ends are resiliently brought into contact with a triangular glass 2 and a front glass 3 are integrally formed at the interior side of a vehicle, etc., body at a partition 5 and glassrun 6 along the center sash 4 with clearance remaining between the same and the triangular glass 2 and front glass 3 which compose a door glass. The lower ends thereof extend into the door which is lower than the belt line BL of the front door 1 shown in Fig. 6.

At the die-molded portion 7 at the upper edge of the center sash, lip pieces 21 and 22 that compose a water receiver along with the above-described lip pieces 23 and 24 are continuously

formed integrally with the lip pieces 23 and 24 of the partition 5 and glassrun 6 at the left and right sides at the interior side of the vehicle, etc., body. And the upper ends thereof are positioned below the roofside weatherstrip 9, as shown in Fig. 5, when the door is closed, and is composed so as to surround the clearance c_1, shown in Fig. 11, which is produced among the differential gap of the die-molded portion 7, triangular glass 2 and front glass 3, and the roofside weatherstrip 9.

With the sealing structure according to the present embodiment, water that invades through the clearance c_1 shown in Fig. 11 passes through clearance c_2 (Fig. 3) between the lip pieces 21 and 22, which compose a water receiver, and the triangular glass 2 and front glass 3, and clearance c_2 (Fig. 4) between the lip pieces 23 and 24 and the triangular glass 2 and front glass 3, and is discharged into the door.

The above-described embodiment shows an example in which the partition 5 and glassrun 6 are provided at both sides of the center sash 4. However, in another embodiment, only the partition 5 may be provided at both sides of the center sash or only the glassrun 6 may be provided there.

In the above-described embodiment, an example in which the sealing structure is applied to a hardtop vehicle, etc., is shown. However, the sealing structure may be applicable to

the center sash of an open-top vehicle, etc., as well.

In addition, in the above-described embodiment, although glass and partition are separately prepared, the glass and partition may be integrally formed.